

**WHAT IS CLAIMED IS:**

1. Polyisocyanates having a uretdione group content of greater than 50 mol%,  
based on the entirety of the types of structure formed by isocyanate  
oligomerization, wherein the residual monomer content is below 0.3% by  
weight and does not exceed 0.5% by weight after six-month storage at  
50°C.
2. A process for preparing the polyisocyanates of Claim 1, comprising  
reacting
  - c) at least one organic isocyanate at reaction temperatures of  $\leq +40^{\circ}\text{C}$   
with a catalyst which comprises at least one trialkylphosphine so  
that the conversion of the free NCO groups is from 1 to 80% by  
weight and then
  - d) separating the active catalyst and any residual, unreacted monomer  
from the reaction mixture.
3. A method for producing polyurethane materials, coatings, adhesives and  
adjuvants comprising adding the polyisocyanates of Claim 1 to a  
composition comprising a binder..
4. Substrates coated with coatings of Claim 3.
5. The process of Claim 2, wherein the trialkylphosphine is selected from the  
group consisting of trimethylphosphine, triethylphosphine,  
tripropylphosphine, tributylphosphine, cyclopentyl-dimethylphosphine,  
pentyl-dimethylphosphine, cyclopentyl-diethylphosphine, pentyl-diethyl-  
phosphine, cyclopentyl-di-propylphosphine, pentyl-di-propylphosphine,  
cyclopentyl-dibutylphosphine, pentyl-dibutylphosphine, cyclopentyl-

5 dihexylphosphine, pentyl-dihexylphosphine, dicyclopentyl-methylphosphine, dipentyl-methylphosphine, dicyclopentyl-ethylphosphine, dipentyl-ethylphosphine, dicyclopentyl-propylphosphine, dipentyl-propylphosphine, dicyclopentyl-butylphosphine, dipentyl-butylphosphine, dicyclopentyl-hexylphosphine, dipentyl-hexylphosphine, dicyclopentyl-octylphosphine, dipentyl-octylphosphine, tricyclopentylphosphine, tripentylphosphine, cyclohexyl-dimethylphosphine, hexyl-dimethylphosphine, cyclohexyl-diethylphosphine, hexyl-diethylphosphine, cyclohexyl-dipropylphosphine, hexyl-dipropylphosphine, cyclohexyl-  
10 dibutylphosphine, hexyl-dibutylphosphine, cyclohexyl-dihexylphosphine, hexyl-dihexylphosphine, dicyclohexyl-methylphosphine, dihexyl-methylphosphine, dicyclohexyl-ethylphosphine, dihexyl-ethylphosphine, dicyclohexyl-propylphosphine, dihexyl-propylphosphine, dicyclohexyl-butylphosphine, dihexyl-butylphosphine, tricyclohexylphosphine,  
15 trihexylphosphine and trioctylphosphine.